IN THE CLAIMS:

1-29 (Cancelled)

30. (Currently Amended) A method for digitally controlling a sensor system comprising:
receiving an analog sensor signal;
converting the analog sensor signal to a digital sensor signal; and
processing the signal to provide an output signal indicating a measured parameter corresponding to the sensor signal; and
digitally controlling one or more components operable to modify the analog sensor signal prior to digitization.

31. (original) The method of claim 30, wherein the method is implemented in a digital signal processor (DSP) and wherein the DSP is embedded in the sensor.

32. (original) The method of claim 30, wherein the method is implemented in a microcontroller and wherein the microcontroller is embedded in the sensor.

33. (original) The method of claim 30, further comprising producing the sensor signal using a digital capacitance gauge.

34. (original) The method of claim 30, further comprising performing iterations of a control loop in a kernel module, wherein the control loop comprises execution of all of a set of high priority tasks and execution of one or more low priority tasks.

35. (original) The method of claim 34, further comprising performing each iteration of the control loop at a periodic time.

36. (original) The method of claim 34, wherein the high priority tasks comprise at least one or more of the group consisting of: reading the digital sensor signal from the analog-to-digital converter; calculating a linearized pressure value from the digital sensor signal; writing the linearized pressure value to a digital-to-analog converter; and conveying the linearized pressure value to one or more port buffers.

37. cancel

38. (original) The method of claim 30, further comprising performing an automatic calibration procedure.

39. (original) The method of claim 38, wherein performing the automatic calibration procedure comprises computing a set of calibration constants upon which linearization calculations are based.

40. (original) The method of claim 38, wherein computing the set of calibration constants is performed using a regression procedure.

41. (original) The method of claim 38, further comprising archiving the set of calibration constants in a non-volatile memory.

42. (original) The method of claim 38, further comprising performing the automatic calibration procedure using calibration data imported from a calibration stand.

43. (original) The method of claim 30, further comprising performing an automatic zero adjust procedure.

44. (original) The method of claim 43, further comprising controlling an analog zero adjust module according to control data generated by the automatic zero adjust procedure.

45. (original) The method of claim 43, further comprising locking out the automatic zero adjust procedure unless a predetermined set of conditions is met.

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47. (original) The method of claim 30, further comprising performing one or more embedded diagnostic procedures.

48. (original) The method of claim 47, further comprising providing an indication of a fault condition detected by the one or more embedded diagnostic procedures.

49. (original) The method of claim 47, further comprising archiving detected fault conditions.

50. (original) The method of claim 30, further comprising transmitting diagnostic data resulting from the one or more embedded diagnostic procedures to a diagnostic port.

51. (original) The method of claim 30, further comprising linearizing the digital sensor signal.

52. (original) The method of claim 51, wherein the digital sensor signal is linearized using linearization expressions based on values stored in a non-volatile memory.

53. (original) The method of claim 52, wherein the non-volatile memory is an EEPROM.

54. (original) The method of claim 30, further comprising temperature compensating the digital sensor signal.

55. (new) A method for digitally controlling a sensor system comprising:

receiving an analog sensor signal;

converting the analog sensor signal to a digital sensor signal;

processing the signal to provide an output signal indicating a measured parameter corresponding to the sensor signal;

performing iterations of a control loop in a kernel module, wherein the control loop comprises execution of all of a set of high priority tasks and execution of one or more low priority tasks;

wherein the low priority tasks comprise at least one or more of the group consisting of: processing communication messages received from a diagnostics port; processing control area network messages; performing ambient temperature compensation; performing a closed loop heater algorithm; servicing temperature LEDs;

monitoring overpressure and zero adjust inputs; servicing status LEDs and switches; servicing an EEPROM; performing an automatic analog scaling procedure; performing an automatic zero adjust procedure; and performing an embedded diagnostic procedure.

56. (new) A method for digitally controlling a sensor system comprising:

receiving an analog sensor signal;

converting the analog sensor signal to a digital sensor signal;

processing the signal to provide an output signal indicating a measured parameter corresponding to the sensor signal;

performing an automatic zero adjust procedure;

controlling an analog zero adjust module according to control data generated by the automatic zero adjust procedure, wherein the zero adjust procedure is locked out unless a predetermined set of conditions is met; and

wherein the predetermined set of conditions include one or more of the group consisting of: inlet pressure being below a zero adjust limit of the sensor; the sensor being at a set point temperature; ambient temperature of the electronics being within a predetermined range; an overpressure signal not being asserted; and no fault conditions existing within the sensor or controller.